DOCUMENT RESUME

ED 340 764 TM 018 020

AUTHOR Resnick, Daniel P.; Peterson, Natalie L.
TITLE Evaluating Progress toward Goal Five: A Report to the National Center for Education Statistics.
SPONS AGENCY National Center for Education Statistics (ED), Washington, DC.
PUB DATE 7 Oct 91
NOTE 38p.; Commissioned paper prepared for a workshop on Assessing Higher Order Thinking & Communication Skills in College Graduates (Washington, DC, November 17-19, 1991), in support of National Education Goal V, Objective 5. For other workshop papers, see TM 018 009-024. Some pages contain some poor quality type.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Academic Achievement; Adult Literacy; Cognitive Measurement; *College Graduates; Communication Skills; Critical Thinking; *Educational Assessment; Education Work Relationship; Evaluation Methods; Higher Education; Measurement Techniques; *National Programs; Problem Solving; *Program Evaluation; Thinking Skills
IDENTIFIERS America 2000; Higher Order Learning; *National Education Goals 1990; Progress Reporting

ABSTRACT

Goal five of America 2000 calls for dramatic improvement in the educational attainment of the nation's adult population. Encompassed in the goal is a charge to increase the number of college graduates who can think critically, communicate effectively, and solve problems. This paper focuses on measures that can be used to assure that this objective is being met. Several measures will be needed to address the many aspects of college learning that contribute to the development of higher order skills. A set of six indicators is proposed, each of which is expected to promote and gauge progress. The proposed measures will focus on the following areas: (1) opportunities for secondary school students to engage in college-level learning; (2) coherence and depth in college programs; (3) contributions of disciplinary associations to the structure of undergraduate major programs; (4) creation and operation of departmental assessment programs; (5) employer and educator perceptions of work readiness in college graduates; and (6) levels of literacy in adult and young adult populations. Reviews by N. Beck, N. Frederiksen, and J. Herman of this position paper are provided. (Author/SLD)

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ED340764

Resnick and Peterson, *Evaluating Progress Toward Goal Five: A Report to the National Center for Education Statistics*

For discussion November 17-19, 1991

Abstract

Goal five of *America 2000* calls for dramatic improvement in the educational attainment of the nation's adult population. Encompassed within the goal is a charge to increase the number of college graduates who can think critically, communicate effectively, and solve problems. The Resnick and Peterson paper focusses on measures that can be used to assure that this objective is being met.

The authors of the paper believe that a variety of measures will be needed to adequately address the many aspects of college learning that contribute to the development of higher order skills. They propose a set of six indicators—both quantitative and qualitative—for this purpose. Each is expected to both promote and gauge progress.

The proposed measures will focus on the following areas: opportunities for secondary school students to engage in college-level learning; coherence and depth in college programs; contributions of disciplinary associations to the structure of undergraduate major programs; creation and operation of departmental assessment programs; employer and educator perceptions of work readiness in college graduates; and levels of literacy in the country's adult and young adult population.

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Evaluating Progress Toward Goal Five:
A Report to the National Center for Education Statistics

Daniel P. Resnick and Natalie L. Peterson

October 7, 1991

The White House and the governors of the United States are embarked on a course that, if supported by Congress, will change our educational system. Expressing a set of understandings reached the previous year at Charlottesville, the administration and the state executives agreed on six goals in 1990 that call for a major transformation in the way the American educational system operates. Goals three, four, and five call for much higher achievement in the formal school experience of young people and the formal and informal learning of adults. To make the policy process responsive to legislators and voters, measures will have to be set up to gauge progress toward these goals. Since these learning goals represent a bold policy agenda to which the administration and the governors have committed themselves and which the Congress is being asked to shape and endorse, the measures chosen will have a double function. They must not only monitor progress toward the goals, but help to make sure that the goals are achieved.

What kind of measures should be chosen? The indicators chosen will not meet our policy

needs if they are only neutral scientific measures, though they should be valid and reliable. Indicators will be expected to play a role in clarifying the goals and making them attainable. Because the United States is at some distance from a satisfactory approximation of the knowledge and capabilities that these goals intend for us as a nation—whether it is 'competency' in key subject areas or a well-prepared workforce—the indicators will also be expected, perhaps in visible ways, to mobilize public action.

The pressure to mobilize public opinion around these goals comes, in large part, from the American business community, whose leadership has been challenged in world markets by nations with better educated workforces that are exploiting economic opportunities more effectively. There is some disagreement in the scholarly literature about how much education the American workplaces of the future will require of their workers.[1] If we extrapolate from current employment statistics, reflecting large numbers of non-skilled jobs that may not survive another decade, the demand for a more educated workforce seems very uncertain. If, however, we look at the growth rate of new hires in different sectors of the workforce, the sectors with increased educational demands are certainly growing more rapidly. Leading firms have begun the process of re-structuring. They have flattened their organizational hierarchies, broadened the job responsibilities of their workers, and provided educational opportunities in the workplace.

The movement for higher quality and productivity in the workplace has its counterpart in the movement for higher standards and restructuring in public schools. States and districts, working with one another, many through the New Standards Project, are making plans to set high standards for their pupils and help their young people achieve them. Curriculum, professional development and parental support are under development in these programs. The indicators chosen to measure progress toward goals three and four will be called upon not only to register the variety of changes in learning outcomes that are underway, but also to encourage changes in the educational system which will make those outcomes possible.

[1] John Bishop, "A Worsening Shortage of College Graduates" in *Educational Evaluation and Policy Analysis*, (forthcoming), reviews these arguments.

Since the standard of living of the nation depends increasingly on bringing to the United States and keeping in this country a large number of highly skilled jobs, the national policy agenda is open for proposals to raise the level of education of school graduates and to upgrade capabilities of already employed workers.[2] It is within that context of policy action that the goals of America's governors and the White House must be placed. The American political agenda is to create a workforce with higher order skills—capable of solving problems, recognizing the broader context of workplace activity, learning how to keep on learning, using technology effectively and devising adaptive responses to new challenges. These are challenges that have been set before both the population that enters the workplace directly after high school and the segment that enters after the completion of one or more years of college.

The Colleges and Goal Five

A substantial part of the entering workforce each year is composed of those with two or more years of college education. The colleges and universities, however, have remained largely outside the framework of the movement to raise standards. This is the case even though higher education can offer considerable resources to aid in the transformation of precollege learning and can expect direct benefits from the success of this process. As many have noted, leaders in higher education seem not to realize the full magnitude of the precollege transformation that is in progress.[3] In some colleges and universities the adaptation to underprepared students is complete and the large doses of remedial offerings have become an expected feature of the curriculum. This passivity has serious implications for the construction of indicators designed to measure transformations in the readiness of our young people for working life.

[2] National Center on Education and the Economy, Commission on the Skills of the American Workforce, *America's Choice: high skills or low wages!* (Rochester, NY: National Center on Education and the Economy, 1990) and U.S. Department of Labor, The Secretary's Commission on Achieving Necessary Skills, *What Work Requires of Schools: A SCANS report for America 2000* (Washington D.C. : U.S. Department of Labor, 1991).

[3] See for instance, Marc Tucker, "Many U.S. Colleges Are Really Inefficient, High-Priced Secondary Schools" in *The Chronicle of Higher Education*, Volume XXXVII, No. 38, p. A36 and Frank Newman "Restructuring the Public Trust" in *AAHE Bulletin*, September 1990, Vol. 44, No. 1, pp. 3-8.

Goal five of *America 2000* demands higher qualifications from the college and non-college populations that constitute our workforce:

> By the year 2000, every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy and exercise the rights and responsibilities of citizenship.

Embraced within the goal are the following five objectives:

> • Every major American business will be involved with the strengthening the connection between education and work.
>
> • All workers will have the same opportunity to acquire the knowledge and skills, from basic to highly technical, needed to adapt to emerging new technologies, work methods, and markets through public and private educational, vocational, technical, workplace or other programs.
>
> •The number of quality programs, including those at libraries, that are designed to serve more effectively the needs of the growing number of part-time and mid-career students will increase substantially.
>
> • The proportion of those qualified students, especially minorities, who enter college, who complete at least two years, and who complete their degree programs will increase substantially.
>
> • The proportion of college graduates who demonstrate an advanced ability to think critically, communicate effectively, and solve problems, will increase substantially.

To reach these objectives, a wide-ranging set of indicators will have to be developed. They will have the large burden of pointing out the directions in which post-secondary institutions should shift in order to increase the capabilities of their graduates. The set will have to include measures of work readiness, educational equity, program availability, degree completion, and college learning. The choice of indicators for this goal is particularly difficult because of the scattered age distribution of the working population, the variety of formal and informal means by which those in the workforce receive their education, and the many different kinds of demands

which characterize the workplace itself.

We have elected to focus on the objective of promoting and measuring college student learning, particularly the learning of four-year college graduates. In our search for appropriate indicators, we will draw on relevant assessment practices in primary and secondary as well as higher education, and take account of recent studies on the capabilities of America's young adult population. The indicators that we will propose are intended to press the institutions, disciplines, students, and teachers functioning together in higher education to change the college learning experience so that a larger portion of college graduates can enter the workforce at the higher level of attainment which goal five demands.

In 1988-89, 1,017,667 baccalaureate degrees were conferred at colleges and universities across the nation.[4] Most of the degrees awarded were from large public institutions varying greatly in quality. Liberal arts colleges represent less than ten percent of the institutions granting baccalaureate degrees. In this graduating class, the most popular field of study was business administration, where 246,659 degrees were granted. The social sciences ranked second, with 107,714 degrees conferred. Other leading majors were education, health, and psychology. Any effort to raise the exit level skills of these students must recognize that such know-how is subject matter dependent and needs to be cultivated through a challenging curriculum that shapes the learning of our undergraduates and their major programs.

What Should College Graduates Know and Be Able to Do?

What is it that a college graduate should know and be able to do? Though the skills that will be demanded by the workplace of the future cannot be predicted with certainty, a number of competencies are already recognized as essential. The recent report by the Department of Labor, *What Work Requires of Schools: A SCANS Report for America 2000*, explores them with

[4] *The Chronicle of Higher Education Almanac*, August 28, 1991, Volume XXXVIII, No. 1, p. 3.

some success.[5]

Employees of the future, the SCANS report argues, will be called upon to demonstrate skills in five different domains. The first involves the uses of resources. In tomorrow's workplace, employees will be repeatedly called upon to schedule time, budget funds, assign space, and arrange staff. The second domain concerns interpersonal skills. Future workers must be adept at working in a team, teaching others new skills, serving clients and customers, exercising leadership, negotiating, and dealing with diversity. The third area of competency focuses on the ability to use and acquire information. Employees will be expected to acquire, evaluate, organize, maintain, interpret, and evaluate information. They should also be prepared to use computers to process this information. The fourth domain is concerned with systems. Employees must have an understanding of how social, organizational, and technological systems work and be able to operate effectively with them. Based upon this knowledge, they should be able to monitor and correct performance and improve or even design systems. The final area of competency involves technology. In the workplace of the future employees will be expected to have a familiarity with a variety of technologies so that they will be able to select, apply, and maintain them.

Each of these domains is based upon a foundation of basic skills, thinking skills, and personal qualities. Basic skills include, at some level, reading, writing, mathematics, listening, and speaking. Thinking skills, sometimes referred to as higher order skills, are those associated with thinking creatively, making decisions, and solving problems. Related skills include knowing how to learn, reason, and organize as well as to process symbols, pictures, graphs, objects and other information. Personal qualities, described by the report, include responsibility, self-esteem, sociability, self management, and integrity.

An effective approach for promoting the thinking skills and personal qualities identified in the SCANS report was adopted by Alverno College in the early 1970s. The college's curriculum

[5] U.S. Department of Labor, The Secretary's Commission on Achieving Necessary Skills, *What Work Requires of Schools: A SCANS Report for America 2000* (Washington D.C.: U.S. Department of Labor, 1991).

and assessment program are designed around eight general abilities that each student is expected to master before graduation. These abilities include: effective communication; analysis; problem solving: valuing in a decision-making context; effective social interaction; effectiveness in individual/environmental relationships; responsible involvement in the contemporary world; and aesthetic responsiveness. Students must demonstrate competence at set levels in each of these areas. They are assessed in a variety of settings, using many different modes.[4] Several of the skills are assessed in public settings, and many are assessed by outside judges with business and community experience.

Clearly, all of the skills and qualities underlying the five domains as well as those within the domains themselves are ones that should be possessed by college graduates. Such skills, however, will also be needed by those who do not attend college. What then, should differentiate college graduates from the rest of the population? Once again, we turn to the notion of demand. Society expects college graduates to have accumulated substantial knowledge within a specific domain. The math major, for example, should not only be able to perform mathematical operations, but should also be able to represent the world of experience with the forms, heuristics and language of mathematics. The history major should not only be able to construct narratives and place historical figures in their national and social contexts, but should also have a deep knowledge of several historical periods including their institutions, cultures, and values.

The majority of colleges and universities, for historical reasons, educate their students through majors in specific disciplines.. What a college student should know and be able to do depends largely upon his or her field of study. The search for students more capable of critical thinking will thus depend in some way on the quality of study in the major field. Our proposal for goal five indicators recognizes this fact.

Knowledge of fields outside the major field is also essential. The college graduate should have a deep understanding of his or her major area of study, but should also be able to relate

[4] The Alverno College Faculty, *Assessment at Alverno College*, (Milwaukee: Alverno Productions, 1979).

knowledge to other disciplines. This view is well expressed in the Association of American Colleges publication, *The Challenge of Connected Learning*:

> To fulfill its role in liberal learning, the major must also structure conversations with the other cultures represented in the academy, conversations that more nearly reflect the diversities within our world and require patient labors of translation.[7]

The problem of translation across fields has grown with knowledge in the disciplines. Each student needs experience in both interpreting the meaning of work in other fields and conveying the meaning of his or her own field to others. The kind of skills and integration that we assumed in goal five depend on that training and capability.

Assessment in Primary and Secondary Education—What Can Be Learned?

As we seek measures of the knowledge and skills of college graduates, we will want to survey the kinds of measures that are used at the primary and secondary level. Are there practices that we may want to emulate at the post-secondary level? Have ways been found to gauge student learning through measures that actually promote learning? The answer is yes, for a few select programs in which assessment is rich in nature and closely tied to a curriculum. Most of the assessment in our primary and secondary schools, however, is not of this kind.

Hundred of millions of standardized tests are given annually to the almost fifty million 5-to 17-year-olds in our schools.[8] Such tests are firmly entrenched in the American educational system, having been used since the Progressive Era for selection, placement, and program

[7] American Association of Colleges, *The Challenge of Connected Learning* (Washington D.C.: American Association of Colleges, 1991), p. 5.

[8] Beverly Anderson, "Test Use Today in Elementary and Secondary Schools," in Alexandra K. Wigdor and Wendell R. Garner (eds.),*Ability Testing: Uses, Consequences, and Controversies*. Part II. Committee on Ability Testing, Assembly of Behavioral And Social Sciences, National Research Council (Washington, D.C.: National Academy Press, 1982), pp. 232-85; Lauren B. and Daniel P. Resnick, "Assessing the Thinking Curriculum: New Tools for Educational Reform," in B. R. Gifford and M.C. O'Connor (eds.), *Changing assessments: Alternative Views of Aptitude, Achievement and Instruction*. Boston: Kluwer. 1991, pp. 37-75.

evaluation.[9] Indeed, no other nation relies so heavily on tests to examine the learning of its young people. Yet, as international studies of student performance in areas like mathematics achievement indicate, our students have scored poorly in comparisons with other countries. In an international mathematics assessment conducted between 1980 and 1982, students from a dozen other countries scored higher than American 13-year-olds in one or more areas of mathematics. Similar results were seen on a 1988 mathematics test where American 13-year-olds had lower scores than their peers in four other nations.[10] American students are more accustomed to test-taking than students from other countries, but they are not more knowledgeable.

The majority of tests given in American schools are multiple-choice in format, requiring only that students recognize right answers, without the obligation to generate responses themselves. While many of these measures are labeled 'achievement' tests, and are expected to be curriculum dependent, they may have little relationship to the intended curriculum of the school and classroom. The format of such tests, in any case, serves to decontextualize and decompose knowledge.[11] Test takers are not called on to show the capacity for integration and higher order thinking that goal five seeks to promote in the workplace. Another problem exists in the fact that most of the tests given are norm-referenced. Norm-referenced measures do not try to gauge the student's mastery of a subject area; instead, level of performance is reported in relationship to a distribution of scores. The test-taker need not know very much to perform better than many others. Tests of this kind will not show the kinds of growth that we look for in a measure for goal five.

Performance-oriented assessments, based on course material that students have prepared, are more likely to be useful for purposes of mobilizing teachers and students to reach the demands

[9] Daniel P. Resnick, "History of Educational Testing" in *Ability Testing: Uses, Consequences, and Controversies*. Part II. Committee on Ability Testing, Assembly of Behavioral And Social Sciences, National Research Council (Washington, D.C.: National Academy Press, 1982), pp. 173-195.

[10] The National Education Goals Panel, *The National Education Goals Report* (Washington D.C.: National Education Goals Panel, 1991), pp. 17-19.

[11] Lauren B. Resnick and Daniel P. Resnick, "Assessing the Thinking Curriculum: New Tools for Educational Reform."

of goal five. Such assessments are widely used nationally across a broad spectrum of course programs only in Advanced Placement (AP) and International Baccalaureate (IB) programs. Approximately 42 percent of U.S. secondary schools, however, offer courses geared toward one or more of the of the 28 AP examinations, which have large performance-based components.[12] The IB program has a small participation rate of only about 150 American schools. Students who take the AP or IB exams are often awarded advanced standing or college credit based upon their performance. Nonetheless, only one in four of the seniors who take the SAT currently register for one or more AP courses.[13] We believe that indicators should be developed that are sensitive to the availability of the College Board AP program in American high schools, the numbers of students who are enrolled, and the success of students on the examinations. Attention to this kind of indicator for goal five, will indicate an understanding of the relationship that goal three, four and five have to one another and will help school administrators, teachers, parents and students to understand better the value that this kind of college-level challenge can have in pre-college programs.

The Undergraduate Curriculum: A Tool For Promoting College Learning

Course requirements are one of the primary tools that institutions of higher education can use to guide the learning process of the college student. To insure that a student has sufficient depth in his or her field of study, most colleges require a certain number of courses or credit hours within the discipline. For instance, Case Western Reserve University requires its chemistry majors to have taken 11 courses in the discipline before graduating. Eight or more courses beyond the introductory level is a common graduation requirement.

Many colleges require students to take a specified number of courses outside the major area of study. All students enrolled in Florida's system of higher education, for example, are required

[12] The College Board, *AP Yearbook 1990* (New York: College Entrance Examination Board, 1990), p. 2.

[13] The College Board, *College Bound Seniors: 1991 Profile of SAT and Achievement Test Takers* (New York: College Entrance Examination Board, 1991) and The College Board, *AP Yearbook 1990*, p. 4.

to take 12 semester hours of coursework in English and six semester hours of mathematics.[14] Other colleges and collegiate structures may mandate that all students take the same core of courses in different disciplines during their freshman and sophomore years. The University of Chicago has a celebrated core program.

Maintaining an indicator of colleges with distribution requirements, however, would not be a useful way to further our national goals for adult learning. Few colleges, even with distribution requirements, offer students the opportunity for integrative interdisciplinary study. One exception is Miami University, which houses The School of Interdisciplinary Studies. Students in the program must enroll in a senior workshop where they meet weekly to discuss their progress on a required interdisciplinary written project. In the past, students have combined disciplines such as chemistry and zoology or music and women's studies.[15]

Requiring a certain number of courses within specified areas of study does not, however, guarantee that a student will gain the level of understanding that the field demands. There must also be some sequence to the courses that the student is required to take. If an English major is required to take five courses in the discipline but chooses only those on the introductory level, he or she would hardly acquire depth of experience and understanding. The Association of American Colleges argues that it is important for a major course of study to be based on a principle or principles of organization. Reflected within this organization should be "a beginning, a middle, and an end—each contributing in a different but specific way to the overall aim of the major."[16] In our view, and we so argue in a later section, an indicator should be developed to express this coherence. Institutions must be encouraged to strive for this goal, and educators and policymakers must be provided with a way to gauge progress toward it.

[14] Terry W. Hartle, "The Growing Interest in Measuring the Educational Achievement of College Students" in Clifford Adelman (ed.), *Assessment in American Higher Education* (Washington D.C.: Department of Education, 1987), p. 5.

[15] Ernest L. Boyer, *College: The Undergraduate Experience in America* (New York: Harper & Row, 1987), pp. 259-260.

[16] Association of American Colleges, *The Challenge of Connected Learning*, pp. 8-9.

A study conducted by Robert Zemsky and his colleagues at the University of Pennsylvania's Institute for Research in Higher Education has made significant headway in this direction.[17] Conducted in the late 1980s at the request of the Association of American Colleges' Council for Liberal Learning, the study was designed to document the condition of the liberal arts curriculum in American colleges and universities and provide some metric by which such institutions could gauge their success at providing structure and coherence in their undergraduate programs.

To gather information on the undergraduate curriculum, student transcripts were collected from 30 colleges and universities representing 16 states and every region of the country. Among the private institutions were four high-priced selective research universities, five high-priced selective liberal arts colleges, six moderately-priced colleges and universities, and six lower-priced colleges. Among the public institutions were five large flagship universities with major research programs and four predominantly undergraduate teaching institutions.

The final transcripts of all students graduating in the spring of 1986 with a baccalaureate degree in arts and sciences, business, or engineering were obtained from 28 of these institutions. Two others instead submitted transcripts of spring 1987 graduates. Transcripts were supplemented by data drawn from course catalogs, and interviews with department chairs. A database of the collected information was compiled.

The curricular structure of each of the participating institution was analyzed in terms of focus, breadth, and depth. Focus was determined by the extent to which "coursework was organized in terms of beginning courses that students would normally take in their first year of college, intermediate courses students would take in either their second or third year of college, and capstone courses students would normally take in their final year."[18] Breadth of study was defined in terms of the number of courses that students took in math/science, social science, and the

[17] Robert Zemsky, *Structure and Coherence.*

[18] Ibid, p. 22.

humanities. Depth was measured by the number of advanced courses—those that cannot be taken by a beginner—that were taken by graduating seniors. This analysis revealed an undergraduate curriculum in substantial need of greater structure and coherence.

Of particular interest were Zemsky's findings about the depth of the undergraduate curriculum.[19] In the study, depth in departmental registrations in different institutions was determined by the portion of courses in the major field taken by seniors which had three or more prerequisites. The number of prerequisites was determined by both course catalog review and the actual enrollment patterns of students. An area of study was said to have substantial depth if one-third of the major courses taken by seniors had three or more prerequisites. If fewer than one in six of the courses in the major field taken by juniors and seniors required three or more prerequisites, then the area of study was said to be lacking in depth. Using this criterion, Zemsky found that the humanities programs, and their majors, were seriously lacking. Nearly eighty percent of the humanities major programs in the sample institutions fell into this category. In only ten percent of the sample was there substantial depth of programs. Faring only slightly better, were the social sciences, where nearly half of the institutions were categorized as lacking. Only mathematics and the natural sciences were deemed to have substantial depth; at least one-third of the major programs in those areas at eighty percent of the institutions in the sample had senior major courses with three or more prerequisites.

Guidance is needed from the disciplinary associations on how the undergraduate major should be constructed. In the American Association of Colleges publication, *Reports From the Fields*, twelve disciplines gave their recommendations. The Mathematical Association of America offers the following guidelines:

> Every topic in every course should include an interplay of applications, problem solving, and theory.... Every student who majors in the mathematical sciences should complete a year-long course sequence at the upper-division level that builds upon two years of lower division mathematics.[20]

[19] Ibid, p. 20.

[20] Ibid, p. 78.

This course of study should enable the math major to "undertake intellectually demanding mathematical reasoning."[21] The reluctance of some disciplinary associations to provide such guidance may decline if an indicator like the one we will propose later in the paper encourages professional interest in structuring the undergraduate major.

It must be remembered, however, that true depth is a function not only of the number of prerequisites a course has, and the opportunity that prerequisites provide for students to work with advanced students, but of the kinds of educational experiences which the course itself provides. Advanced coursework should allow for rich integrative experiences that develop higher order skills in disciplinary and interdisciplinary work. Senior year capstone courses, involving comprehensive exams, theses or projects, are vehicles for achieving this goal.

Comprehensive exams during the senior year can require students to pull together and integrate what they have learned in their four years of study. Such examinations can take many forms. GRE subject area examinations and professional certification tests are sometimes used for this purpose, but the exams may not relate directly to the institutions's own curriculum. There is, however, increasing use of examinations that are developed by faculty to reflect institutional missions and curricula. The University of Tennessee at Knoxville, for example, has asked faculty in 104 disciplines to agree on performance objectives and comprehensive exams for graduating seniors.[22]

A project of the Association of American Colleges, supported by the Fund for the Improvement of Post-Secondary Education, created a network of eighteen institutions to explore the effects on student learning and departmental behavior of comprehensive written and oral examination in a half-dozen undergraduate fields. Institutions like Swarthmore College have been requiring comprehensive exams, with external examiners, since the 1920s, but the number of

[21] Ibid, p. 78.

[22] Trudy W. Banta, "The Use of Outcomes Information at the University of Tennessee" in (ed.) Peter T. Ewell, *Assessing Educational Outcomes* (San Francisco: Jossey-Bass Inc., 1985), pp. 19-32.

schools with such requirements remains small. The AAC study found that participation in this assessment program did promote student motivation and learning, and that faculty found it a rewarding professional experience, but that there were many institutional disincentives for the creation and administration of such programs.[23] Such courses are outside the mold of the relatively low-cost and low-demand courses that are common fare for senior majors in many disciplines.

Senior project courses can also function to promote high levels of understanding. They have the potential to strengthen many of the skills highlighted in the SCANS report. Students may be given the opportunity to work in small groups on developing creative solutions to "real world" problems. Students majoring in public policy at Carnegie Mellon University, for example, are required to enroll in a project course during their senior year. In the past, courses have focused on topics such as recycling, hazardous waste, and automobile safety. Students and faculty from different disciplines work together to meet the needs of real clients.

The senior thesis can also serve as a valuable capstone experience. In this case, it is not the capacity for integration or application that is at issue, but the ability to behave as an expert in a defined domain of knowledge. This expertise will be demonstrated in different ways, depending on the discipline, but the thesis is both a demanding learning experience and a demonstration of what a student knows and can do. Ernest Boyer in *College: The Undergraduate Experience*, recommends that "students be asked to write a senior thesis that would relate the major to historical, social, or ethical concerns." [24] Only a few schools, like Reed College, however, are known for the way in which theses shape the senior year experience.

Assessing Work Readiness Through Employer Surveys

No set of indicators for goal five can afford to omit the perceptions that employers have of college

[23] FIPSE Report, External Examiners and Comprehensive Exams, Association of American Colleges, unpublished report. The first author of this paper served as evaluator.

[24] Ernest L. Boyer, *College: The Undergraduate Experience in America*, p. 259.

students as they enter the workforce. An annual employer survey would raise the salience of employers' expectations for college students at the same time that it would measure progress toward greater work readiness. A recent study on the preparedness of high school graduates for employment and higher education serves as an excellent starting point for developing a survey of this kind. Conducted in September 1991 by Louis Harris and Associates, the study was based upon telephone interviews with 2,446 employers, educators, parents, recent students, and members of the general public.

The employers surveyed were 401 line executives and human resource officers randomly drawn from Dunn & Bradstreet's listings of businesses and government agencies. Two-thirds of those queried were from private industry. Equal numbers of small ($5 to $20 million in sales), medium ($20 to $100 million in sales), and large (over $100 million) companies were represented. All other employer respondents were from state and federal government agencies.

The educator sample was comprised of 301 admissions officers and faculty members from equal numbers of trade and vocational schools, two-year colleges, small four-year colleges, and large four-year universities. All were selected from Dunn & Bradstreet's listing of educational institutions. About half of the questions that educators were asked in a telephone interview, were those that employers had also been asked. Also interviewed were 1744 members of the general public. From this group, a sample of 250 parents of recent graduates and 511 recently graduated students was established. Recent graduates were defined as those who had completed high school four to eight years ago.

Telephone interviews for the study were conducted with a list of 30 to 70 questions. Each major group surveyed was asked a different, but overlapping set of questions. Employers were asked to answer approximately 40 questions, mainly about preparedness of recent high school graduates for employment within their organizations. Educators were asked 35 questions mainly concerning the capabilities of recent high school graduates who had entered their institutions.

Parents were asked to assess the abilities of their son or daughter. Former students were asked to assess their own abilities. Parents and former students were asked approximately 70 questions. All participants were asked a number of questions concerning the quality of primary and secondary education in America.

At the core of the employer, educator, parent, and former student protocols was a set of items requiring the participant to rate recent high school graduates on a common set of 15 attributes related to a young person's ability to perform well in higher education or on the job. Each of the new entrants to the workforce, for example, was asked the following question:

> Now, I want you to rate the preparation you feel your high school schooling gave you on each of these key areas. On _____ do you feel your high school preparation was excellent, pretty good, only fair, or poor?

The survey participants were asked to rate recent high school graduates in each area as excellent, pretty good, only fair, poor, or not sure.

Four of the 15 attributes concerned basic skills in reading, writing, and mathematics. Two attributes—the ability to solve complex problems and the ability to read and understand written and verbal directions—were higher order in nature. The remaining attributes described personal qualities such as having a good attitude and knowing how to dress and behave. The survey participants were asked to rate the preparedness of recent high school graduates in each area as excellent, pretty good, only fair, poor, or not sure.

Participant responses concerning the 15 attributes were reported in terms of percent positive and percent negative comments. The pattern of responses was clearly displayed, and very disturbing for those who seek to advance the agenda of goal five. Employers and educators, on one side, and students and parents on the other, have very different and often antithetical views of the capabilities of recent entrants into the workforce. Only one-third of the employers surveyed

believed that recent graduates had the ability to read and understand verbal and written instructions. Eighty-six percent of parents and recent workforce entrants, by contrast, affirmed the ability of recent graduates to and understand oral and written instructions. A gap of approximately 40 points divided employers and recent graduates.

Measuring Literacy-Related Skills

The NAEP Young Adult Literacy Assessment identified literacy skills as a key element in work readiness. Literacy-related skills are a key determinant of an individual's ability to function both on the job and in the larger society. These skills include not only reading and writing at a basic level, but also the ability to interpret, extract, and apply information from a variety of texts. The NAEP Young Adult Literacy Assessment represents one very sophisticated attempt to gauge such skills.[25] Administered in 1985, the survey was designed to measure the level of literacy in America's young adult population. We believe that the results of an assessment of this kind could serve as a useful indicator for gauging progress toward goal five and displaying literacy expectations for college graduates to a broad public.

The survey consisted of an oral interview designed to provide background information and gauge performance on a series of literacy tasks. Three thousand five hundred young adults between the ages of 21 and 25 served as the sample population. Approximately one-third of the interview was devoted to background questions about the participant's activities, occupational status, aspirations, education, early language experiences, and household characteristics. This information was collected both for descriptive and comparative purposes. Interviews were conducted in person by a trained interviewer and lasted approximately 30 minutes. Over 70 questions were used to elicit the desired background information.

After completing the background interview, participants were asked to answer nine printed

[25] Irwin S. Kirsch and Ann Jungblut, *Literacy: Profiles of America's Young Adults* (Princeton, New Jersey: Educational Testing Service, 1990 [second printing]), Final Report.

core questions targeting the most basic literacy skills. Those who were able to answer at least three of these questions were allowed to move on to three sets of 10-15 literacy tasks. A total of 105 tasks were used in the survey. Respondents unable to correctly answer more than two of the core questions were given an oral interview rather than more printed items. Ten oral literacy tasks were administered to this group as well as to a subsample of those who successfully answered the required number of core items.

Three general types of tasks were used, classified as prose, document, and quantitative. Prose tasks required the respondent to demonstrate an understanding of skills associated with interpreting and using information from newspaper articles, poems, and other extended textual material. Document tasks required the respondent to locate and use information on texts such as labels, charts, paycheck stubs, deposit slips, and order forms. Quantitative tasks required individuals to perform mathematical operations using figures embedded in a variety of text types. A number of questions were also drawn from the 1983-84 NAEP Reading Assessment. These multiple-choice items were included so that the performance of young adults in the survey could be linked to that of the 9-, 13-and 17-year-olds who participated in the Reading Assessment.

Tasks were designed to simulate situations in which a young adult would be called upon to demonstrate literacy skills. Sometimes, of course, the demands were made for an individual response by the reader when the real-world response would have involved conversation with others. One task, for example, required respondents to examine an actual bus schedule and answer the following question:

> On Saturday afternoon, if you miss the 2:35 bus leaving Hancock and Buena Ventura going to Flintridge and Academy, how long will you have to wait for the next bus?

In another, respondents were asked to make distinctions between two types of employee benefits. A third involved interpreting instructions from an appliance warranty. Though some tasks, presented in written form, required only multiple-choice responses, others were open-ended.

Tasks were assigned values from 100 to 500 according to level of difficulty, using item response theory psychometric models These levels of difficulty were determined "on the basis of the complexity of the information processing demands required for successful performance rather than by the vocabulary length or sentence length of the text alone."[26] The simplest task, requiring the respondent to sign his or her name on a social security card, was assigned a value of 116. A value of 376 was assigned to a task that involved using a page from a catalog to fill out an order form and calculate total and itemized costs. The technical report cited indicates how these values were determined, but presented simply as scores they do not communicate well to the public the nature and level of literacy of the sampled population.

Some other problems were found with the way the results of this sophisticated survey were reported. Results were given in three literacy domains: prose, document, and quantitative. The terms prose, document, and quantitative, however, do not indicate clearly the type of literacy that has been sampled. With relatively little additional effort, it may be possible to present this data in ways that relate to the constructs of practical literacy and informational literacy that are widely employed in literacy research.

On the prose scale, benchmarks were set at the 200, 275, 325, and 375 levels. On the document scale, they were provided for the 150, 200, 250, 300, and 350 levels. Can common "plausible values" be found for comparable difficulty levels on the different scales? If it were possible to do so, results would be easier to communicate to the lay public. Perhaps qualifiers like "advanced" and "proficient" could then also be applied to the benchmark levels.

In 1993, the National Center for Education Statistics will begin to administer a survey of adult literacy every four years.[27] This survey will be targeted at Americans age 16 and over. It has

[26] Ibid, section III, p. 9.

[27] The National Education Goals Panel, *The National Education Goals Report*, p. 207.

been proposed that the NAEP Young Adult Literacy Assessment be expanded for this purpose.[38] We support this proposal.

Recommendations

To gauge progress toward the kind of educational attainment envisaged by goal five, we recommend that the Department of Education employ a variety of indicators. Multiple measures will be needed to convey the changes in our institutional functioning and cultural expectations that are to necessary to measure the progress of educational reform. The indicators and reports that we propose the National Center for Education Statistics (NCES) provide were chosen to enlarge the public's understanding about the many factors that affect change in the educational achievements of our population.

There are six ways in which we would like to see the measurement and evaluation of college learning proceed. Our choice of measures follows from the preceding analysis of the best way to assess learning gains in the secondary schools; the importance of demanding curricula in major fields of college learning; the role that can be played by disciplinary associations in changing patterns of college study; the ways in which colleges and universities are establishing learning outcome measures for their students; the gulf between workplace needs and the perceived capabilities of recent school graduates; and the need for continued monitoring of literacy-related skills in the adult population.

1. Advanced Placement Exams and Courses—The Advanced Placement program successfully provides high school students with the opportunity to take college-level courses. We believe that the amount of college-level learning that goes on in the high school should be measured as part of the progress toward goal five. We propose that three indicators be used for this purpose. The first

[38] Educational Testing Service and Westat, "Literacy Definition Committee Proposal for a National Adult Literacy Survey" (Submitted to Office of Educational Research and Improvement, 1991).

will indicate the availability of AP courses at the individual high school level. Currently, less than half of our high schools offer this opportunity.[29] Data should be published annually by the NCES that will show the portion of high schools that offer one or more of these courses. The second indicator, which was employed in the Goals Panel Report for goal three, tallies the number of students who take these course examinations, and creates a trendline with this data.[30] Currently, no more than one-quarter of those who take the SAT as seniors have also registered for one or more AP examinations.[31] The third indicator can be the success of these students on their examination, as it is gauged by their scores. The portion of those receiving a three or higher on the common five-point scale should be reported.

2. Curriculum Coherence—A transcript survey supplemented by interviews and course catalogs is a non-intrusive way of determining what types of courses are being taken by college students across the country. We believe that an annual survey of students transcripts from 30-50 institutions, modeled after the one conducted by Zemsky and his colleagues at the University of Pennsylvania, would provide valuable information on the amount of advanced study in undergraduate major fields. Zemsky's analysis provides data on the extent to which seniors are registering in demanding courses. This can be determined by an analysis of coded transcripts, with very little in the way of interviews or catalog review. We believe that this is a useful indicator of both institutional depth in college programs and student choice of demanding courses of study. The CNES should construct trendline data on depth in the undergraduate program. Current findings are that students in areas outside science and mathematics do not have sufficient depth in their programs. The effect of publishing these reports annually is likely to be significant effort by colleges and universities to monitor what major programs expect of graduating seniors.

3. Direction to Undergraduate Study from the Major Disciplinary Associations— Guidance from disciplinary organizations can also play a significant role in defining expectations for student work

[29] The College Board, *AP Yearbook 1990*, p. 2.

[30] The National Education Goals Panel, *The National Education Goals Report*, p. 13.

[31] The College Board, *AP Yearbook 1990* and The College Board, *1991 Profile of SAT and Achievement Test Takers* (New York: College Entrance Examination Board, 1991).

in major fields of study. Those expectations can be framed in terms of what the workplace requires and post-collegiate schooling demands. Some associations, like those in mathematics and history, have devoted major efforts to clarifying those expectations. Others have barely begun to reflect on the relationship between the demands of graduate research, applied workplace activity, and undergraduate programs. We believe that an inventory of the guidance available from the different associations, by field, should be issued regularly. It should list those organizations that have submitted recommendations, along with those that have not. Such a listing would put pressure on disciplinary associations that have in the past neglected to assume adequate responsibility for undergraduate programs.

4. College and University Assessment Programs—Given the variety of institutions in American higher education, no single assessment can recognize the many kinds of learning that institutional programs encourage. We believe that an assessment process should encourage both progress toward high standards and faithfulness to different institutional missions. The most desirable way to foster both these goals is through demanding major programs that call for capstone senior experiences. These can take many forms, but we call attention to comprehensive written and oral exams, theses, projects, portfolios, self-reports and a variety of demonstrations.. These programs can encourage students to integrate and extend knowledge in their major areas of study.

The assessments should be institutionally generated and faculty owned, so that faculty will be committed to them and they can evolve over time in response to local needs. The assessment, will take many forms. We propose that an inventory be created of institutions with assessments in the major field, and that the inventory be updated annually. This inventory should not only report which institutions have assessment programs, but also how these programs compare to one another in setting high standards and reflecting institutional missions.

5. A Survey of Employers—The innovative Harris survey offers a useful method for measuring perception of the preparedness of high school graduates. We believe that a similar survey should

be designed to gauge the extent to which recent college graduates are able to meet the needs of today's workplace. The survey we propose would be administered on a yearly basis to a representative sample of employers and recent college graduates, using the sampling methods proposed in the original survey. Introducing additional questions with respect to job contexts, types of student majors, types of employers, etc., would require a much larger survey sample, and may be unmanageable, given the varieties of collegiate education and workforce activity. The current survey has the virtue of its directness and simplicity.

We do not recommend extending the survey to parents of recent college graduates. The perceptions of these parents are less likely to be informed by knowledge about the capabilities of their children as college students than they were about them as high school students. By contrast, we do recommend that educators be interviewed. We want to not only measure changes in their perceptions, but through publication of these reports, to focus attention on the need to raise expectations for learning in the colleges and universities, and indicate the gulf—which we hope will narrow—between what employers want and what they are likely to find among new entrants to the workforce.

6. Expansion of the NAEP Young Adult Literacy Assessment—We believe that the Department of Education's proposed literacy survey of the adult population will be a valuable measure of the capabilities of the working-age population. We suggest that the survey be designed in a manner that permits disaggregation of various segments of the population, in particular recent college graduates. This can be done through the type of oral background interview used for the NAEP Young Adult Literacy Assessment. Respondents, however, consistent with the goal of improving the quality of the college educational experience, should be asked to describe the adequacy of their course programs for the demands made upon them in the workplace. The types of occupations in which they are employed should also be identified.

Conclusion

Goal five of America 2000 calls for a transformation in the educational attainment of the nation's adult population. Specifically targeted by the goal are college graduates, who are expected by the year 2000 to increasingly "demonstrate an advanced ability to think critically, communicate effectively, and solve problems." This paper has focussed on a number of measures that can help to assure that our college graduates possess these capabilities.

The gains in achievement targeted by goal five should not, in our view, be separated artificially from the other changes in attainment that are called for by the other five goals. Thus, the information that we propose the National Center for Education Statistics provide will not only enlarge the public's understanding of factors that affect change in the educational achievements of our college population, but also indicate the interdependence in achievement at different levels of schooling.

We believe that the nation is quite far from achieving the levels of attainment called for by goal five. For this reason, we have proposed six measures that are intended to both gauge and promote achievement. Each suggests a direction for change that we believe that our educational institutions should follow and a criterion by which progress in that direction may be judged.

The proposed "basket of indicators" targets the following domains: the availability of Advanced Placement courses and student success in them; coherence and depth in college programs; contributions of disciplinary associations in guiding the structure of undergraduate major programs; the creation and operation of departmental assessment programs; perceptions of employers and educators about the work readiness of college graduates; and levels of literacy in the country's adult and young adult population.

The measures proposed here, particularly the first four, are intended to realize the ambitions

of goal five through changes in educational processes in our colleges and high schools. The last two measures are more sensitive to learning outcomes, and offer some opportunity to gauge the effects of program changes at different institutions on the literacy of young people and perceptions of their work readiness.

There will certainly be some negative response to the use of multiple measures that are so sensitive to process and fail to focus exclusively on outcomes. In our view, however, outcomes are very context dependent. If we seek better performance from college graduates, we will need to change the behavior of many actors: students, teachers, department heads, institutional leaders, disciplinary associations, parents, and employers. The use of these multiple measures is intended to guide changes by each of these actors and communicate what has taken place to the broader public. No single measure can satisfy our many needs.

Paper: **Evaluating Progress Toward Goal Five: A Report to the National Center for Education Statistics**

Authors: Daniel P. Resnick and Natalie L. Peterson, Carnegie-Mellon University

Reviewer: Nancy Beck, Educational Testing Service

> This was a thoughtful paper that proposes expanded use of specific and currently available instruments or methods to collect information about the state of higher education. It is the authors' premise that organized collection and publication of information based on use of these instruments will lead to improvement.

This paper reflects the strong orientation of Resnick and Peterson toward the importance of the major. They are up front in their belief that higher education takes place in the major; if you improve the quality and substance of study in the major fields you will improve higher education.

If the task was to "...identify, define, and assess a specific set of skills consistent with objective 5.5 - communication, critical thinking, and problem solving..." then this paper addresses them only obliquely. Several sets of skills are discussed, but they are not related back to the specific skills of Goal 5, and no attempt at definition is made.

What the authors do, instead, is identify six currently available measures/methods and discuss how expansion of each will improve higher education. The strength of these links varies - some have promise, others are fairly tenuous. The stated goals of the panel are addressed rhetorically but not substantively.

Since Resnick and Peterson did not approach their task through the specific skills, applying the evaluation criteria to each of their six recommendations did not prove very satisfactory. However, using the criteria as an organizing mechanism was useful in reviewing the measures/methods which were presented as "...six ways in which we would like to see the measurement and evaluation of college learning proceed." (p. 21)

1. **Advanced Placement Exams and Courses**

   The Advanced Placement Program is to be used as an indication of the amount of college-level learning going on in American high schools. This information, in turn, provides a measure of progress toward Goal 5. It is not made clear, however, how or why Advanced Placement courses or scores provides a measure of the specific 5.5 skills, or how reporting: (1) availability of AP courses at

individual high schools, (2) number of students who take these courses and exams, and, (3) success of these students on the AP exams will move us closer to the Goal.

2. **Transcript Survey**

An annual survey of transcripts from 30 - 50 institutions would provide a unobtrusive way of determining what courses students are taking. The authors see this as an indicator of both institutional depth in programs and of student choice of demanding (or not-so-demanding) courses of study. They further argue that "The effect of publishing these reports annually is likely to be a significant effort by colleges and universities to monitor what major programs expect of graduating seniors." (p. 22)

Such a survey no doubt would provide interesting and useful information about higher education. It is not made clear in this paper, however, how the particular collection of courses taken by a student is related to the level or acquisition of the skills under question.

3. **Direction to Undergraduate Study Provided by the Major Disciplinary Associations**

The thesis here is that the disciplinary associations must become more active in defining - and raising - the expectations for student work in the major fields of study. The authors' strong belief that the major is where any meaningful education takes place is reflected in their arguments for this recommendation.

Once again, this is an excellent idea with much to recommend it; in all likelihood it would have a positive influence on education. It does not, however, lend itself in any obvious way to the task of identifying, defining, and assessing the skills at issue.

4. **College and University Assessment Programs**

As the authors describe this activity it is another way to encourage demanding programs in the major. It consists of a published inventory - to be updated annually - of institutions with assessments in the major.

This is another recommendation that could have a positive influence on higher education, but it would provide only a very indirect measure of the skills at issue.

5. **A Survey of Employers**

This is a recommendation to adapt, for use with college graduates, the Harris survey that asked employers about their perceptions of the preparation of high school graduates. It would evaluate the 5.5 skills where they are used - in the work place.

If the adaptation were carefully done to get at the skills in question, and the validity and acceptability of self-reported (student) and perceptual (employer) data can be established, this proposed measure could be potentially very useful. An added attraction is that it could be done at relatively low cost and implemented fairly quickly. Organizations that specialize in this kind of research abound.

6. **Expansion of NAEP Young Adult Literacy Assessment**

Use of this "...valuable measure of the capabilities of the working age population" (p. 24) is the paper's final recommendation. In this one, the authors do not go far enough. They propose only to expand the survey by asking respondent about "the adequacy of their course program" and the occupations in which they are employed. To assess the skills specified in Goal 5, the nature of the tasks surveyed would have to be changed drastically. The survey as presently structured focuses on literacy (not surprising, given its title!), not on "advanced ability to think critically, communicate effectively, and solve problems." In addition, the assessment would need to be directed toward recent college graduates, not the general population.

If expanded and modified to address the skills and the population at issue, and strengthened by further research and instrument development, this recommendation has great potential for addressing in a serious way the issues and concerns of the National Goals Panel.

General Comments

The weakness of the Resnick/Peterson paper is that too many of their recommendations use instruments or techniques that are narrowly focused and limited in their applicability to the issue at hand. The real strength, however, is in reminding us that there are a number of extant instruments that, with some adaptation, have real potential for moving us forward. This paper offers not so much a cure as a way of getting a better patient history.

Comments on a Position Paper

Evaluating Progress Toward Goal Five: A Report to the National Center for Education Statistics

by Daniel P. Resnick and Natalie Paterson
Reviewed by: Norman Frederiksen

This paper in unusual in its contents, as compared with the other papers I have revieved. It suggests a number of potentially useful ways to improve instruction and to create indicators of progress, and the ideas came from commercial establishments, employer surveys, NAEP, and some colleges and universities, I am glad to note that the authors did not limit themselves to "Goal 5-Objective 5" because it is vague and is limited to a highly generalized concept of thinking.

There are some topics that I wish had been included; they have to do with performance tests.-tests that simulate problem situations as they appear in the real world.

One example of a performance test is a type of test that was invented in the late 50s and is still being used by many large corporations, according to a friend who pioneered its use at AT&T. It is an in-basket test.-a test that simulates tasks often required by officials in a business, a school, a government agency, or any other organization. It in nov used primarily for selection and training of new employees, but it could be adapted to the assessment of thinking in different domains.

The name came from the boxes found on the desks of Naval officers--two boxes labeled IN and OUT. The in-basket contains the mail--letters, memos, directives.-and the examinee's job is to read the mail and write replies.

In ordar to set up a scoring procedure, the responses written by many subjects were sorted into a much smaller set of categories. Scoring them involved matching the written responses to the categories, which makes possible a qualitative description of perfomance. Another possibility in to get a panel of judges to assign numerical values to the categories, and thus obtain

numerical scores based on the categories, The idea could easily ba adapted to many situations. (Sos Hemphill, J. R., Griffiths, D. E., & Frederiksen, N. (1962), Administrative Performance and Personality, Nev York: Teachers College, Columbia University; and Froderikeen, N., Jensen, O., & Beaton E. A. (1972), Prediction of Organizational Behavior, Nev York: Pergamon Press.)

Another example is a test that would be useful in assessing and training higher-order thinking skills; it is called Formulating Hypotheses. The test simulates a situation in which a "researcher", (the subject) must interpret the results of his/her experiment. The researcher studies a graph or table shoving the results of the experiment, and reads a statement of the finding (written by an assistant). Then the researcher writes hypotheses that might account for ths finding.

The scoring procedure again in based on a classification of ths ideas written by a group of subjects, and expert judges assign a value to each category. Then scores can be generated by matching hypotheses to the categories.

Other tests of this kind have such titles as Evaluating Proposals, Solving Methodological Problems, and Measuring Constructs. Such tests certainly require knowledge of a domain and ability to fit their ideas to the data. (Sas Frederiksen, N., & Ward, W. C. (1978), Measures for ths study of creativity in scientific problem solving, Applied Psychological Measurement, 2,, 1-24; and Ward, W. C., Frederiksen, N., & Carlson, S. B. (1978), Construct validity of free-respones and machine-scorable versions of a tent of scientific thinking, Journal of Educational Measurement, I7, 11-29.)

Review of
Evaluating Progress Toward Goal Five:
A Report to the National Center for Education Statistics

by
Daniel P. Resnick and Natalie L. Peterson

Review by Joan Herman, UCLA/CRESST
Draft

The Resnick and Peterson paper presents a number of concrete recommendations for assessing progress toward Goal Five, focusing on the objective of "measuring college student learning, particularly the learning of four year college graduates." The recommendations are well presented and solidly supported. The authors clearly understand the policy context and circumstances which motivate the national goals, goal five among them, as well as the context and complexities of assessment in higher education. The paper presents an interesting perspective on the role of assessment in promoting progress.

Resnick and Peterson caste their argument and their proposed measures in a broader policy context and the argue that the role of assessment, and the indicators which comprise it, is both to monitor progress toward national goals and to stimulate or motivate such progress -- as the authors state, "the indicators will also be expected, perhaps in visible ways, to mobilize public action." (p. 2) Indicators, in their view, should provide direction on the ways in which post secondary institutions should shift to increase the capabilities of their students; indicators thus have a proactive

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function in the change process. In fact, one of the indicators Resnick and Peterson propose, the "contributions of disciplinary associations to the structure of undergraduate major programs" seems to have almost solely a motivation function, i.e., to help assure that disciplinary associations will be active in setting standards for higher education, presumably thereby providing some grounding for future measures of goal five as well as focusing attention on what those standards.

Resnick and Peterson reasonably argue that SCAN's skills can be a basis of measures for goal 5, but that the definition of these skills need to be enriched to reflect competencies which should be expected of college graduates. This is one basis for their recommendation for indicators of the coherence and depth of college programs -- that is, college programs need to provide students with the opportunities to gain depth of disciplinary knowledge; the measure of opportunity provides a somewhat feasible and minimum proxy for student outcomes, as well as an important process indicator in support of such outcomes. In terms of more direct measures of these outcomes, Resnick and Peterson argue for an expansion of the NAEP Young Adult Literacy Assessment. While showing solid understanding of the existing instrument as well as the need to adapt it for assessment of college outcomes, the paper could provide more specific suggestions about the ways that assessment would need to be adapted and augmented -- for example, what skills should be particularly emphasized?

In terms of the types of items which should be emphasized, Resnick and Peterson clearly favor complex, performance oriented

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measures. They argue strongly against norm-referenced measures and against multiple choice measures. While I would agree that performance and criterion-referenced measures will be important, I believe it would be a mistake to discard all multiple choice items; furthermore, while criterion-referenced measures are more helpful for formative purposes, norm-referenced comparisons -- particularly in the international arena -- also will continue to be important.

I strongly agree with Resnick and Peterson that a variety of indicators will be needed to assess Goal 5, and that those indicators need to consider both process and outcomes. The set they advocate -- advancement placement exams and courses, curriculum coherence, college and university assessment programs, employer and graduate surveys, and expansion of the NAEP Young Adult Literacy Assessment makes sense, although the costs for rigorous assessment in these areas will be more than substantial. For example, transcript studies to assess curriculum coherence will be very expensive, and something more than surface analysis may be required to assure that course sequences actually reflect substantive rigor. (Similarly with the proposed indicator of college assessment programs. Just requiring a capstone experience is insufficient: such experiences must have rigorous standards.) Furthermore, if one of the purposes of such assessments is to motivate reflection and improvement, the sample of colleges studied will have to be both substantial and annually changing; that is, one of the ways such an assessment can serve as a motivator is if every college feels its curriculum has a reasonable change to come under public scrutiny.

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The Harris-Poll type approach seems a cost effective way to gather information from college graduates and their employers about student preparedness. The student survey for this and the recommended augmentation of the NAEP Young Adult Literacy Assessment might also want to consider measures of level of effort -- for example, Pace's College Student Experiences Questionnaire (Pace, 1987) -- as a proximate measure of program rigor and student engagement.

Finally, Resnick and Peterson make an excellent point about the importance of reporting and communication issues. If progress indicators are to function proactively and to shape behavior, it is mandatory that they be well and easily understood by those whose behavior is to be shaped as well as by those who are supposed to exert influence for change -- e.g., the media and the public. There is considerable tension between the need to simplify information to make it understandable and the danger of compromising its integrity. Furthermore, R&D attention needs to be given to clear and effective communication to the variety of audiences who are intended to use the information.

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